Patent claims

1. A vacuum extraction unit for a device used to structure the surface of a workpiece (20), in particular a printing form, such as for example a flexographic printing block, by means of radiation, in particular laser radiation, with
- a hood (10), which in its operating position covers a region of interaction between the radiation and the workpiece surface, with
-- a rear side (11), to which a vacuum extraction line (13) can be connected,
-- two side walls (16), which have end edges (19) which lie opposite the workpiece in the operating position of the hood, and
-- two directing walls (17, 18), which are located between the side walls (16), extend transversely in relation to the latter and which together with the two side walls (16) delimit in the hood (10) a vacuum extraction channel (14) with an inlet opening (15), which lies opposite the workpiece in the operating position of the hood, an edge (21) of one (17) of the two directing walls lying opposite the workpiece (20) in the operating position of the hood (10), while the other directing wall (18) has a convex, cylindrical curvature lying opposite the workpiece surface in the operating position of the hood and, in the region of this curvature, at least one opening (23), through which the radiation for processing the workpiece surface is guided.

2. A vacuum extraction unit for a device used to structure the surface of a workpiece (20), in particular a printing form, such as for example a flexographic printing block, by means of radiation, in particular laser radiation, with

- a hood (10), which in its operating position covers a region of interaction between the radiation and the workpiece surface, with
-- a rear side (11), to which a vacuum extraction line (13) can be connected,
-- two side walls (16), which have end edges (19) with a contour which is adapted to the contour of the surface of a workpiece (20) to be processed, so that corresponding gap seals are formed when the end edges (19) lie opposite the workpiece (20) in the operating position of the hood (10), and
-- two directing walls (17, 18), which are located between the side walls (16), extend transversely in relation to the latter and which together with the two side walls (16) delimit in the hood (10) a vacuum extraction channel (14) with an inlet opening (15),
the hood (10) being provided with an opening (23), through which the radiation for processing the workpiece surface is guided.

3. The vacuum extraction unit as claimed in claim 2, characterized in that an edge (21) of one (17) of the two directing walls lies opposite the workpiece (20) in the operating position of the hood (10), while the other directing wall (18) has a convex, cylindrical curvature lying opposite the workpiece surface in the operating position of the hood and, in that the at least one opening (23) through which the radiation for processing the workpiece surface is guided is arranged in the region of the curvature of the other directing wall (18).

4. The vacuum extraction unit as claimed in claim 1 or 3, characterized in that the curvature of the curved directing wall (18) is curved in the form of an arc of a circle.

5. The vacuum extraction unit as claimed in claim 4, characterized in that the curving of the curvature of the curved directing wall (18) is greater than the curving of the surface of the workpiece (20).

6. The vacuum extraction unit as claimed in claim 1 or 3, characterized in that the curvature of the curved directing wall (18) is exponentially curved.

7. The vacuum extraction unit as claimed in claim 1 or 3 to 6, characterized in that the opening or openings (23) through which the radiation for processing the workpiece (20) is guided is provided in the region of the curved directing wall (18) that lies closest to the surface of the workpiece (20) in the operating position of the hood (10).

8. The vacuum extraction unit as claimed in claim 1, characterized in that the end edges (19) of the side walls (16) have a contour which is adapted to the contour of the surface of a workpiece (20) to be processed, so that corresponding gap seals are formed.

9. The vacuum extraction unit as claimed in claim 2, 3 or 8, characterized in that the contour of the end edges (19) of the side walls (16) is a polyline adapted to the contour of the workpiece surface.

10. The vacuum extraction unit as claimed in claim 2, 3 or 8, characterized in that the contour of the end edges (19) of the side walls (16) is an arc of a circle adapted to the contour of the workpiece surface.

11. The vacuum extraction unit as claimed in one of claims 2, 3 or 8 to 10, characterized in that the distance between the end edges (19) of the side walls (16) and the workpiece surface in the operating position of the hood (10) is less than 50 mm, preferably less than 30 mm, in particular less than 10 mm but greater than 0.5 mm, and with particular preference between 1 mm and 5 mm.

12. The vacuum extraction unit as claimed in one of claims 2, 3 or 8 to 11, characterized in that the width of the gap seals formed between the end edges (19) of the side walls (16) and the workpiece surface lies in the range between 0.1 mm and 30 mm.

13. The vacuum extraction unit as claimed in one of claims 2, 3 or 8 to 12, characterized in that the hood (10) is exchangeably fastened to a working laser head (30), so that when processing cylindrical workpieces (20) with different diameters a hood from a number of hoods (10) is respectively chosen and fastened to the working laser head (30), the side walls (16) of which hood have end edges (19) with a contour which is adapted as well as possible to the contour of the surface of the workpiece (20) respectively to be processed.

14. The vacuum extraction unit as claimed in one of claims 2, 3 and 8 to 13, characterized in that the side walls (16) of the hood are provided with means, in particular movable lamellae or exchangeable side parts, by which the contour of the edges of the side walls (16) that lie opposite a workpiece (20) can be changed in order to adapt them to the surface of the workpiece (20).

15. The vacuum extraction unit as claimed in one of the preceding claims, characterized in that, in the region of the curved directing wall (18) that lies closest to the surface of the workpiece (20) in the operating position of the hood (10), each working jet or beam delivered by a processing head, in particular each working laser beam (24) delivered by a working laser head (30), is provided with an opening (23) of its own, through which the radiation for processing the workpiece (20) is focused on the latter.

16. The vacuum extraction unit as claimed in one of the preceding claims, characterized in that a C-shaped cover ring (40) which has two ends that follow the circumference of the workpiece and are located at a distance from each other and which has a substantially U-shaped cross section is provided, the hood (10) being arranged adjacent one of the two circumferential ends of the cover ring (40).

17. The vacuum extraction unit as claimed in claim 16, characterized in that the C-shaped cover ring (40) is exchangeable, so that when processing cylindrical workpieces (20) with different diameters a cover ring from a number of cover rings (40) is respectively chosen and used, the inside diameter of which ring is adapted as well as possible to the diameter of the cylindrical workpiece (20) respectively to be processed.

18. The vacuum extraction unit as claimed in claim 16, characterized in that the side walls (41) of the C-shaped cover ring (40) are provided with means for reducing its free inside diameter, so that said ring can be set to correspond to the diameter of

the cylindrical workpiece (20) respectively to be processed.

19. The vacuum extraction unit as claimed in claim 18, characterized in that the means for reducing the free inside diameter of the C-shaped cover ring comprise a lamellar seal (48).

20. The vacuum extraction unit as claimed in claim 19, characterized in that the individual lamellae (49) of the lamellar seal (48) are pivotably fastened to the side walls (41) of the cover ring (40).

21. The vacuum extraction unit as claimed in claim 18, characterized in that the means for reducing the free inside diameter of the C-shaped cover ring comprise exchangeable side parts, in particular side plates.

22. The vacuum extraction unit as claimed in one of claims 16 to 21, characterized in that the C-shaped cover ring (40) is circumferentially subdivided into at least two ring segments, which are pivotably held against each other.

23. The vacuum extraction unit as claimed in claim 22, characterized in that the C-shaped cover ring (40) is circumferentially subdivided into three ring segments of different circumferential lengths, the circumferential length of an upper ring segment corresponding approximately to half the circumferential length of the cover ring (40), while the lower ring portion has two shorter ring segments.

24. The vacuum extraction unit as claimed in one of claims 16 to 22, characterized in that a vacuum

extraction nozzle (47) is arranged in an intermediate space between the hood (10) and a circumferential end of the C-shaped cover ring (40) that is located upstream of the hood (10).